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ABSTRACT

This report presents estimates of the population for July 1, 1970, to 1982 for Puerto Rico, the Virgin Islands of the United States, American Samoa, Guam, the Northern Mariana Islands, and the remainder of the Trust Territory of the Pacific Islands. Census counts for 1970 and 1980 are also shown for each of the areas. In addition, the report presents the components of population change for these areas for the 1970-80 and 1980-82 periods--natural change (births minus deaths) and net migration (the number of persons migrating to a particular area minus the number migrating from the area). Information is provided on the different methodologies used to derive data for each area, limitations of the estimates, and data sources. (Author/CMG)

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Population Estimates and Projections

Series P-25, No. 943
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Estimates of the Population of Puerto Rico and the Outlying Areas: 1970 to 1982

(Estimates in this report supersede those for 1980 and 1981 published in Current Population Reports, Series P-25, No. 919. Estimates for Puerto Rico and the outlying areas for the 1960's and 1950's appear in Current Population Reports, Series P-25, Nos. 603 and 336.)

This report presents estimates of the population for July 1, 1970, to 1982 for Puerto Rico, the Virgin Islands of the United States, American Samoa, Guam, the Northern Mariana Islands, and the remainder of the Trust Territory of the Pacific Islands.[1] Census counts for 1970 and 1980 are also shown for each of the areas. These areas had an estimated population of 3.6 million in 1982. Small areas under American jurisdiction in the Pacific Ocean, such as Midway, Wake, and Canton Islands, and Johnston Atoll, are excluded; there were 1,082 persons on these islands in 1980.

The report also presents the components of population change for these areas for the 1970-80 and 1980-82 periods—natural change (births minus deaths) and net migration (the number of persons migrating into a particular area minus the number migrating from the area). In some of the areas shown, net migration is not estimated directly but is derived as the difference between the total amount of change and natural change.

METHODOLOGY

Because the availability of data relating to population change varies from territory to territory and the concentration of special population groups in some of the areas makes it difficult to rely on standard methods, different procedures are used for each area. The procedures used to compute intercensal estimates for 1970-80 are described in Current Population Reports, Series P-25, No. 919.

[1]As of October 1, 1979, the Canal Zone ceased to be under the "jurisdiction, control, or sovereignty" of the United States. Therefore, population estimates are no longer shown for this area. For estimates through 1976, see Current Population Reports, Series P-25, No. 731.

Puerto Rico. The estimates for Puerto Rico were based on the 1980 census and on reported statistics for each of the components of population change. Before 1980, births had been corrected for underregistration. However, the correction has been dropped since the births are now nearly fully reported. The migration component was derived from monthly passenger statistics on arrivals to and departures from Puerto Rico compiled by the Commonwealth Government. The migration estimate for Puerto Rico is the sum of centered 12-month moving averages of the reported monthly data. This compensates for bias introduced by short-term fluctuations in passenger data which reflect the seasonal movement of transients (tourists and other visitors) rather than the movement of migrants to a new residence. The movement of transients tends to cancel out over longer periods.

Virgin Islands. The estimates for the Virgin Islands were based on the 1980 census and on reported births and deaths. Component Method II was used to estimate net migration. In this method, net migration is estimated on the basis of school enrollment data using the difference between the estimated population of elementary school age and the population of school age expected on the basis of the most recent census and births since the census. A more detailed discussion of the method can be found in Current Population Reports, Series P-25, No. 640.

American Samoa. The estimates for American Samoa were based on the 1980 census and on births and deaths reported by the Government of American Samoa. Since there is no reporting system for migration, net migration must be estimated indirectly. For April 1, 1980, through July 1, 1982, the average an-

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nual amount of net migration was estimated based on the level of residual net migration for the 1977-80 period. The 1977-80 period was chosen because the Government of American Samoa conducted a survey in 1977 which could be used in conjunction with the 1980 census and with reported births and deaths to estimate net migration. The procedure used to estimate net migration actually yields an estimate of net migration plus any errors in the data.

Guam. The estimates of the population of Guam were developed by adding the components of change to the relevant population base. The July 1, 1980, 1981, and 1982 estimates were derived using a base composed of the 1980 census count less the estimated population on April 1, 1980, who were born in the United States.[3] The population base is restricted because of the large and relatively transient Federally affiliated population for which migration is substantial and difficult to estimate. Rather than estimate migration for this population group, administrative records were used to determine the number of Federally affiliated persons on each estimate date. The following were added to the relevant population base:

1. *Natural increase.* The excess of births over deaths is based on reported birth and death statistics. Excluded are the births and deaths occurring in the U.S. Naval Hospital, which are accounted for in step 4.
2. *Change in alien contract workers.* This category is composed primarily of contract workers brought in from the Philippines by the Department of Defense. The estimates are based on information provided by the Guam Department of Commerce.
3. *Net alien immigration.* These are persons accepted for permanent residence in the United States. The estimate is based on Immigration and Naturalization Service figures on immigrants who reported on their visa application that they intended to live on Guam. It is assumed that 40 percent of the immigrants each year either leave Guam or inaccurately reported their intention of living on Guam.
4. *Federally affiliated population.* The number of persons in the Armed Forces stationed on Guam was obtained from the U.S. Department of Defense. The Guam Department of Commerce provided data on the numbers of Federal civilian employees and dependents of both Federal civilian employees and the military.
5. *Guamanian inductions less discharges.* The number of persons in the Armed Forces in the United States who lived on Guam before joining the military is available from the Department of Defense. One half the change in preservice residence on Guam was used to approximate inductions less discharges on Guam.

No data are available on the movement of the nonfederally affiliated population who are not covered above, but this component of net migration is probably not large.

Previous tests of the estimation procedure for Guam have shown a very high bias in the procedure. Preliminary analyses suggest this bias may result from inflated estimates of immigration to Guam and from the double-counting of certain groups of federally affiliated persons. To correct for these errors, estimated emigration has been increased from 20 to 40 percent of immigrants, and an estimate of Guamanian inductions into the Armed Forces less discharges has been incorporated into the procedure.

Northern Mariana Islands. Net migration for April 1, 1980, to July 1, 1982, was estimated based on revised migration estimates for the period 1973 to 1980. The estimates for July 1, 1980, 1981, and 1982 were then derived by adding the components of population change to the 1980 census count. Since net migration is computed as a residual and vital statistics are likely to be underreported, the residual probably includes underreported births and deaths to a much greater extent than in American Samoa. For this reason, net migration is not shown for the Northern Marianas or the Trust Territory in table 1.

Trust Territory of the Pacific Islands, excluding Northern Mariana Islands. The methodology used in deriving these estimates was basically the same as that used for the Northern Mariana Islands. The only difference was that the net migration was based on net migration computed using the September 12, 1977, Skill and Occupation Survey conducted by the Office of Planning and Statistics of the Government of the Trust Territory of the Pacific Islands and on the 1980 census. It should also be noted that the census for the Trust Territory, excluding the Northern Mariana Islands was taken on September 15, 1980. As mentioned above, net migration is not shown in table 1 due to the suspected substantial underreporting of vital statistics.

[3]The April 1, 1980, American population on Guam was estimated based on data furnished by the Guam Department of Commerce and the U.S. Department of Defense.

LIMITATIONS OF THE ESTIMATES

The areas for which estimates are presented in this report are unique in terms of size, location, and composition. This creates difficulty in developing appropriate estimating procedures, much less standard procedures that are applicable for all the areas. The poor quality and absence of adequate data make it difficult to prepare accurate estimates. The estimation techniques used in this report were selected either on the basis of a test of methods against the 1970 census or 1980 census[3] or on the basis of the use of additional data sources not previously available. A comparison of the 1980 census results and the estimates for 1980 is shown in table A.

For Puerto Rico, the estimating technique now used remains essentially unchanged from that used for the 1960's and 1970's. The accuracy of the estimate depends very heavily upon canceling out in the migration statistics the large number of visitors who move between Puerto Rico and the mainland of the United States. Since gross arrival and departure data obviously contain a large number of tourists, net monthly figures are computed and smoothed using a 12-month moving average. This process provides rough approximations of net migration for Puerto Rico.

In the case of the Virgin Islands, where Component Method II is employed, the difference between the April 1, 1980, estimate and the census count was trivial, only 23 persons. In 1970, the difference using that method in tests was less than 1 percent.

The estimating procedure used for American Samoa is a means of bridging a period when no possible independent migration estimates can be developed. The 1970 and 1980 censuses, along with a 1974 special census and the 1977 survey, provide reference points which, in combination with reported vital statistics, can be used to yield acceptable estimates of net migration for the intervening periods. The actual migration for each year in the period is unknown. In the absence of any other information concerning the annual migration pattern, it has been assumed that there was a smooth annual net outmigration during each of these periods.

For Guam, as indicated earlier, the estimates are based on a special estimating method which yields point estimates of the various subcategories of the population. The test of this method for the 1960-70 period showed an overestimate of about 10 percent. In 1980, the magnitude of the error of closure suggests that this level and direction of error still existed in the estimates. Likely explanations for this include the lack of accurate migration data as well as conflicting information on persons who were born in the 50 States and on the special populations employed in the current methodology.

The estimates for the Northern Mariana Islands contain a similar level of error and are biased in the same direction. The 1980 error was −1,794 persons, or −10.7 percent. As was the case for Guam, the lack of any migration data combined with the lack of censuses or surveys during the intercensal period poses a serious problem in estimating the Northern Marianas population.

The Trust Territory of the Pacific Islands population estimates have essentially the same limitations as those for the Northern Mariana Islands. Fortunately, the existence of the 1977 Skill and Occupation Survey provided an additional, and apparently accurate, reference point. The error in estimating 1980 was only −61 persons or −0.1 percent.

Efforts will continue to be made to correct the estimation errors to the degree that available methodologies and data will permit.

SOURCES OF DATA

Most of the statistics used to prepare the area estimates presented in this report were obtained from the local governments of the outlying areas. Data on births and deaths were obtained from the local govern-

[3]For more information on the 1970 test, see Current Population Reports, Series P-25, No. 73[illegible]. The 1980 test results are reported in Current Population Reports, Series P-25, No. 919.

Table A. Comparison of 1980 Census and 1980 Population Estimates for Puerto Rico and the Outlying Areas

Area	1980 Census	1980 provisional population estimate	Error[1]	Perc[illegible] err[illegible]
Puerto Rico	3,196,520	3,195,130	1,390	-
Virgin Islands	96,569	96,546	23	-
American Samoa	32,297	32,260	37	0.7
Guam	105,979	116,251	-10,272	-9.7
Trust Territory of the Pacific Islands, excluding Northern Mariana Islands	116,149	116,210	-61	-0.1
Northern Mariana Islands	16,780	18,574	-1,794	-10.7

- Represents zero.

[1]The error of closure is the difference between the 1980 census count and the 1980 provisional population estimate.

[2]Base for percent is 1980 census count.

ments for Puerto Rico and the outlying areas. Armed Forces data are based on figures provided by the Department of Defense. School enrollment data for the Virgin Islands were supplied by the Virgin Islands Department of Education. For Puerto Rico, data on migration were supplied by the Puerto Rico Planning Board. The number of Federal civilian employees on Guam was obtained from the Guam Department of Commerce.

ROUNDING OF ESTIMATES

Each estimate in this report has been rounded independently to the nearest thousand (Puerto Rico) or hundred (other areas) from figures computed to the last digit. Hence, the sum of the parts may differ from the total shown. Percentages are based on unrounded numbers.

Table 1. Estimates of the Components of Change in the Resident Population of Puerto Rico and the Outlying Areas of the United States: 1970 to 1982

(Resident population includes persons in the Armed Forces stationed in each area. Each estimate has been rounded to the nearest thousand for Puerto Rico and to the nearest hundred for the outlying areas)

Period and area	Population at end of period	Change		Components of change		
		Number	Percent	Births	Deaths	Net migration[1]
APRIL 1, 1980-JULY 1, 1982						
Caribbean Areas						
Puerto Rico	3,261,000	65,000	2.0	160,000	47,000	-47,000
Virgin Islands	101,500	5,000	5.2	5,500	1,200	600
Pacific Areas						
American Samoa	33,800	1,500	4.6	2,600	300	-800
Guam	110,800	4,800	4.6	[2]6,600	[2]900	[3]-800
Trust Territory of the Pacific Islands[4]	120,400	4,300	3.7	6,600	900	([5])
Northern Mariana Islands	17,700	1,000	5.7	1,400	200	([5])
APRIL 1, 1970-APRIL 1, 1980						
Caribbean Areas						
Puerto Rico	3,196,520	484,000	17.9	[6]744,000	194,000	[7]-66,000
Virgin Islands	96,569	34,100	54.6	26,600	5,000	12,500
Pacific Areas						
American Samoa	32,297	5,100	18.9	10,600	1,400	-4,100
Guam	105,979	21,000	24.7	[2]30,700	[2]4,100	[3]-5,700
Trust Territory of the Pacific Islands[4]	116,149	27,600	31.2	36,000	5,300	([5])
Northern Mariana Islands	16,780	4,600	37.5	5,300	900	([5])

[1]For 1970-80, includes error of closure (the amount necessary to make the components of change add to the net change between censuses).

[2]Total births and deaths. Previous reports excluded births and deaths in military hospitals.

[3]Includes movement of members of the Armed Forces and their dependents. Previous reports excluded this type of movement.

[4]Census taken September 15, 1980. Periods covered are April 1, 1970-September 15, 1980 and September 15, 1980-July 1, 1982.

[5]Because part of the residual migration in these areas reflects underregistration of vital statistics, migration figures are not shown.

[6]Births corrected for underregistration. Correction was dropped beginning in 1980.

[7]Includes net movement of persons on military air transport.

Table 2. Estimates of the Resident and Civilian Populations of Puerto Rico and the Outlying Areas: 1970 to 1982

(Each estimate has been rounded to the nearest thousand for Puerto Rico and to the nearest hundred for the outlying areas)

Date (July 1, except as noted)	Puerto Rico	Virgin Islands	American Samoa	Guam	Trust Territory of the Pacific Islands	Northern Mariana Islands
RESIDENT POPULATION						
1982	3,261,000	101,500	33,800	110,800	120,400	17,700
1981	3,245,000	98,300	33,100	110,000	118,100	17,300
1980 (Sept. 15)	-	-	-	-	116,149	-
1980	3,206,000	97,700	32,400	106,900	115,600	16,900
1980 (April 1)	3,196,520	96,569	32,297	105,979	-	16,780
1979	3,165,000	96,200	32,000	103,900	113,300	16,500
1978	3,115,000	95,900	31,400	102,000	111,200	16,100
1977	3,078,000	93,200	30,800	101,200	109,200	15,700
1976	3,024,000	96,200	30,300	102,500	107,000	15,300
1975	2,933,000	94,500	29,600	102,100	104,800	14,900
1974	2,885,000	89,900	29,100	101,300	102,500	14,600
1973	2,862,000	84,100	28,600	105,600	100,000	14,200
1972	2,846,000	76,300	28,200	96,800	96,300	13,600
1971	2,766,000	70,900	27,700	92,300	92,800	13,000
1970	2,716,000	63,500	27,300	86,500	89,400	12,400
1970 (April 1)	2,712,033	62,468	27,159	84,996	[1]88,500	[1]12,200
CIVILIAN POPULATION						
1982	3,258,000	101,500	33,800	102,800	120,400	17,700
1981	3,242,000	98,300	33,100	101,500	118,000	17,300
1980 (Sept. 15)	-	-	-	-	116,100	-
1980	3,202,000	97,700	32,400	97,500	115,500	16,900
1980 (April 1)	3,192,000	96,600	32,300	96,700	-	16,800
1979	3,162,000	96,200	32,000	94,600	113,100	16,500
1978	3,111,000	95,900	31,400	92,300	111,000	16,100
1977	3,074,000	93,200	30,800	91,400	109,100	15,700
1976	3,020,000	96,200	30,300	91,800	106,900	15,300
1975	2,933,000	94,500	29,600	91,200	104,800	14,900
1974	2,885,000	89,900	29,100	89,500	102,500	14,600
1973	2,862,000	84,100	28,600	87,400	100,000	14,200
1972	2,846,000	76,300	28,200	84,500	96,300	13,600
1971	2,766,000	70,900	27,700	81,000	92,800	13,000
1970	2,716,000	63,500	27,300	75,200	89,400	12,400
1970 (April 1)	2,701,000	62,500	27,100	71,300	[1]88,300	[1]12,200

[1]Estimates consistent with the Apportionment Census of September 1973. The Federal census of 1970, which showed a population count of 9,640 for the Northern Mariana Islands and 81,300 for the Trust Territory of the Pacific Islands, excluding the Northern Mariana Islands (plus 3,960 on Kwajalein Island), appears to have been incomplete.

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